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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/574,680	04/04/2006	Markus Siegert	12810-00232-US	1729
23416 7590 02/14/2008 CONNOLLY BOVE LODGE & HUTZ, LLP P O BOX 2207 WILMINGTON, DE 19899			EXAMINER KATAKAM, SUDHAKAR	
			ART UNIT 1621	PAPER NUMBER
			MAIL DATE 02/14/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/574,680	Applicant(s) SIEGERT ET AL.	
	Examiner Sudhakar Katakam	Art Unit 1621	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 June 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>4/4/06</u> | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Information Disclosure Statement*

1. The examiner has considered applicant's Information Disclosure Statement of 4<sup>th</sup> April 2006. Please refer to the signed copies of the PTO-1449 forms attached herewith.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hara et al** (US 5,248,827) in view of **Kaibel** (Chem.Eng.Technol. 10, 1987, 92-98).

**Hara et al** teaches a process for producing an ethylenamine, which comprises reacting ammonia with an ethanolamine, such as monoethanolamine, and the formed ethylenamines are ethylenediamine (EDA), diethylenetriamine (DETA), triethylenetetramine (TETA), tetraethylenepentamine (TEPA), piperazine (PIP),

monoethanolamine (MEA), and N-(2-aminoethyl)ethanolamine (AEEA) etc. [col. 5, lines 1-17]. **Hara et al** also teach that the formed ethylenamines are separated into the respective components by distillation and the distillation may be conducted in a batch system or in a continuous system [col.6, lines 25-36 and Table 1].

The difference between the **Hara et al** and the instant claims is that **Hara et al** is silent on using the dividing wall columns for the distillation to separate the ethylenamines. However, **Kaibel** cures this deficiency.

**Kaibel** teaches distillation columns with vertical partitions and their advantages in separating feed mixtures into their individual components. These distillation columns can separate a feed mixture into 3 or 4 pure fractions in a single distillation step [see Fig. 1]. **Kaibel** also teaches that the basic principle of vertical partitions can be extended and the addition of further partitions in theory permits the separation of feed streams into any number of pure fractions [see Fig.5 in page 94]. **Kaibel** also teach the theoretical trays in the distillation column and showed the performance of a distillation column with a vertical partition between the 20th and the 40th theoretical tray (see Fig. 8). The location of the feed and the side outlet are at the same height in the column. Depending on relative volatilities of the components, a further optimization with regard to energy consumption may be achieved when the feed and the side outlet are at different heights in the column. In the present example, the feed inlet would be lower than the side outlet and the purity of the medium boiling component would be further increased [see column 2 in page 95]. The distillation column with a vertical partition permits the medium boiling components to distill both to the upper and lower ends of the

partition and to recombine in the outlet section. **Kaibel** teach the advantages of distillation columns with the vertical partitions. These are capable of separating a feed mixture into 3 or 4 pure fractions. This is advantageous especially for heat sensitive components. These can be separated from their higher and lower boiling impurities at a lower thermal stress. In this way better product qualities were obtained in production columns [see page 98 under 'Applications']. Figure 2 shows the thermally coupled distillation columns.

In summary, **Hara et al** teaches a process for production of ethylenamines, and also teach that the formed ethylenamines are separated into the respective components by distillation and the distillation may be conducted in a batch system or in a continuous system. **Kaibel** teaches distillation columns with vertical partitions and their advantages in separating feed mixtures into their individual components.

Dividing wall column for the distillation are known in the art and are not novel. Applicants specification acknowledges various dividing wall type distillation columns and their control strategies in the separation of chemicals. However, no process for separation of mixtures containing ethylenamines is explicitly taught in the prior art. So, with respect to the separation process there described will lie in whether or not application of a dividing wall column in the separation of ethylenamines is obvious.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the distillation columns with vertical partitions to separate the ethylenamines into their individual components with the predictable expectation success. Therefore, one of ordinary skill artisan in the art would have been

motivated to combine the teachings of the references in order to arrive at the alternative method for separating the ethylenamines. For the foregoing reasons the instantly claimed process is made obvious.

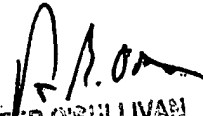
**Conclusion**

5. No Claim is allowed.
6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sudhakar Katakam whose telephone number is 571-272-9929. The examiner can normally be reached on M-F 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yvonne Eyler can be reached on 571-272-0871. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Sudhakar Katakam  
Patent Examiner

  
PETER O'SULLIVAN  
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